AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A method for control of mobile packet flows forwarded on ~~the~~ an IP-based user plane, where each mobile user data packet flow is separate and different from session set up messages sent with IP layer control signaling and/or session layer control signaling, comprising the steps of :

a. controlling individual mobile user data packet flows forwarded on the IP-based user plane from a common, IP-based control plane provided with one or more midcom agents, where the common, IP-based control plane is separate from the IP-based user plane, said control being provided by:

b. each mobile user data packet flow registering its presence in each middlebox it encounters on its way from its source to its destination in the IP-based user plane, and

c. in response to step b, each middlebox in the IP-based user plane registering itself and the identities of mobile user data packet flows it handles in the IP-based user plane at a midcom agent in the common, IP-based control plane using an extended midcom signalling protocol, and

d. after step c, the midcom agent signalling control orders to the registered middleboxes, said orders pertaining to the handling of the mobile user data packet flows at respective middleboxes in the IP-based user plane.

2. (Previously Presented) A method in accordance with claim 1, further comprising the midcom agent sending its control orders to an individual mobile packet flow via the middlebox at which said mobile packet flow registers.

3. (Previously Presented) A method in accordance with claim 1, further comprising the midcom agent sending its control orders to an individual mobile packet flow via another midcom agent than that at which the mobile packet flow registered.

4. (Previously Presented) A method in accordance with claim 1, further comprising the midcom agent using the identity of the middlebox that registered in order to find the functionality the middlebox has and provide a corresponding control order that it sends to the middlebox.

5. (Previously Presented) A method in accordance with claim 1, wherein the midcom agent controls a number of middleboxes provided in a network comprising:

a. an ingress middlebox, sitting on the edge of the network where an individual mobile packet flow enters the network, filtering out control messages and tunnelling them to the midcom agent, and

b. the midcom agent, in response sending control messages to each of the middleboxes it controls, dividing the IP layer into an IP control layer and an IP user plane.

6. (Previously Presented) A method in accordance with claim 1, further comprising the midcom agent using a routing table to send control messages to the respective middleboxes on the IP control plane using an extended midcom protocol.

7. (Previously Presented) A method in accordance with claim 1, further comprising the midcom agent sending control messages to the middleboxes by first sending them to the ingress middlebox from which they are sent in the same channel as the user data.

8. (Previously Presented) A method in accordance with claim 1, wherein a domain comprises middleboxes and a midcom agent, the method further comprising:

a. forwarding control messages from one domain to another by having an ingress middlebox, sitting on the edge of a network at which an individual mobile packet flow enters,

b. filtering out control messages and tunnelling them to the midcom agent, and

c. the midcom agent forwarding them to an egress middlebox at which the mobile packet flow exits the network.

9. (Previously Presented) A method in accordance with claim 8, further comprising exchanging step c. for a step of returning a control message to the ingress middlebox from where it is forwarded along a same path as the user data flow.

10. (Previously Presented) A method in accordance with claim 1, further comprising plural midcom agents, provided at the IP control plane, simultaneously controlling one and the same mobile packet flow.

11. (Previously Presented) A midcom agent comprising a plurality of control function sets, each set relating to the operation of an individual middlebox, and comprising control orders for control of the operation of the corresponding middlebox according to the method claimed in claim 1.

12. (Currently Amended) A communication system comprising:

a plurality of IP based networks;

a session controller for set up of a communication path that traverses selected one of the networks, each selected network having an ingress middlebox at which a user data packet flow enters the network and an egress middlebox at which the flow exits the network, where the user data packet flow is separate and different from session set up messages sent with IP layer control signaling and/or session layer control signaling,

each network comprising:

a midcom agent located in an IP control plane,

a plurality of middleboxes located in an IP user plane separate from the IP control plane,

an extended midcom protocol allowing for communication between the midcom agent and the middleboxes,

wherein said middleboxes are configured to detect a user data packet flow forwarded on the IP-based user plane and register its identity at the midcom agent located in the IP control plane together with the identity of the middlebox at which the user data packet flow was detected, and

wherein said midcom agent, in response to a combined flow and middlebox registration, is configured to send a flow control order to the middlebox in the IP-based user plane using the extended midcom protocol, said flow control order instructing the middlebox how to handle the detected user data packet flow in the IP-based user plane.

13. (Currently Amended) The communication system in claim 12, wherein the user data packet flow is a mobile packet flow, and wherein in response to movement of a mobile terminal associated with the mobile packet flow, a new middlebox in the IP-based user plane is configured to detect the ~~user~~ mobile packet flow and register the identity of the ~~user~~ mobile packet flow and the identity of the new ~~mobile box~~ middlebox with the midcom agent located in the IP control plane, and the midcom agent is configured to send a flow control order to the new middlebox instructing the new middlebox how handle the detected flow.

14. (Currently Amended) The communication system in claim 12, wherein the user flow is a mobile packet flow, and wherein in response to movement of a network associated with the mobile packet flow, a new middlebox in the IP-based user plane is configured to detect the ~~user~~

mobile packet flow and register the identity of the ~~user~~ mobile packet flow and the identity of the new ~~mobile box~~ middlebox with the midcom agent located in the IP control plane, and the midcom agent is configured to send a flow control order to the new middlebox instructing the new middlebox how handle the detected flow.

15. (Currently Amended) A midcom agent located in a control plane for controlling mobile user data packet flows over an IP-based user plane separate from the control plane, where each mobile user data packet flow is separate and different from session set up messages sent with IP layer control signaling and/or session layer control signaling, comprising electronic circuitry configured to:

receive a middlebox registration message from each of multiple middleboxes ~~associated with~~ in the IP-based user plane;

register each middlebox for which a middlebox registration message is received;

receive from each of the registered middleboxes one or more mobile user data packet flows being handled by each of the registered middleboxes in the IP-based user plane; and

signal a control order to each of the registered middleboxes for handling the mobile user data packet flows at each of the registered middleboxes.

16. (Currently Amended) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to send its control orders to an individual mobile user data packet flow via the middlebox at which said mobile packet flow registers.

17. (Previously Presented) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to use the identity of the middlebox that registered in order to find the functionality the middlebox has and provide a corresponding control order that it sends to the middlebox.

18. (Previously Presented) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to control a number of middleboxes provided in a network comprising:

a. an ingress middlebox, sitting on the edge of the network where an individual mobile packet flow enters the network, filtering out control messages and tunnelling them to the midcom agent, and

b. the midcom agent, in response sending control messages to each of the middleboxes it controls, dividing the IP layer into an IP control layer and an IP user plane.

19. (Previously Presented) A midcom agent in accordance with claim 15, wherein the midcom agent is configured to use a routing table to send control messages to the respective middleboxes on the IP control plane using an extended midcom protocol.

20. (Currently Amended) A middlebox for controlling mobile user data packet flows over an IP-based user plane, where each mobile user data packet flow is separate and different from session set up messages sent with IP layer control signaling and/or session layer control signaling, comprising electronic circuitry configured to:

receive a midcom agent announcement message, the midcom agent located in a control plane separate from the IP-based user plane in which the middlebox is located;

send a middlebox registration message to the midcom agent;

send a mobile user data packet flow registration message to the midcom agent for one or more mobile packet user data flows being handled by the middlebox in the IP-based user plane; and

receive a control message from the midcom agent in the control plane for handling the one or more mobile user data packet flows in the IP-based user plane.